1AP20 Rec'd FCTFT0 10 APR 2006 <110> FIVE PRIME THERAPEUTICS, INC. WONG, JUSTIN HESTIR, KEVIN COLLINS, AMY <120> KIAA0779, SPLICE VARIANTS THEREOF, AND METHODS OF THEIR USE <130> 08940.0030-00304 <140> PCT/US2004/033408 <141> 2004-10-12 <150> 60/510,612 <151> 2003-10-10 <160> 38 <170> PatentIn version 3.2 <210> 1 <211> 291 <212> DNA <213> Homo sapiens <400> 1 atgctgacgc tcggtgaaca gttgcctttg gtcacaagat ttagaagaca cagtqtccat 60 cctcccagat tggatctctt tttcatatgg atcttctgtt tctatgtctt tttaaaaaaat 120 aactttttgg gaaacctttt ggattacaac tgttcatcct cacctatgca aagaaaggga 180 agctattgct gggattttga ggagatggtc ctagaacaat tggagattca tacgcacaca 240 aagaacctca acccttacct cacaccagac acaaaagcta ccttcaaata a 291 <210> 2 <211> 231 <212> DNA <213> Homo sapiens <400> 2 atgctgacgc tcggtgaaca gttgcctttg gtcacaagat ttagaagaca cagtqtccat 60 cctcccagat tggatctctt tttcatatgg atcttctgtt tctatgtctt tttaaaaaat 120 aactttttgg gaaacctttt ggattacaac tgttcatcct cacctatgca aagaaaggga 180 agctattgct gggattttga ggaggcagtc cgttgccact gggcagtata g 231

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His Ser Val His Pro Pro Arg Leu Asp Leu Phe Phe Ile Trp Ile Phe 20 25 30

Cys Phe Tyr Val Phe Leu Lys Asn Asn Phe Leu Gly Asn Leu Leu Asp $35 \hspace{1.5cm} 40 \hspace{1.5cm} 45$

Tyr Asn Cys Ser Ser Ser Pro Met Gln Arg Lys Gly Ser Tyr Cys Trp 50 60

Asp Phe Glu Glu Met Val Leu Glu Gln Leu Glu Ile His Thr His Thr 65 70 75 80

Lys Asn Leu Asn Pro Tyr Leu Thr Pro Asp Thr Lys Ala Thr Phe Lys 85 90 95

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<211> 76

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His Ser Val His Pro Pro Arg Leu Asp Leu Phe Phe Ile Trp Ile Phe 20 25 30

Cys Phe Tyr Val Phe Leu Lys Asn Asn Phe Leu Gly Asn Leu Leu Asp 35 40 45

Tyr Asn Cys Ser Ser Ser Pro Met Gln Arg Lys Gly Ser Tyr Cys Trp 50 55 60

Asp Phe Glu Glu Ala Val Arg Cys His Trp Ala Val 65 70 75

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Gly Lys Ser Gln Asp Ala Glu Ala Arg Lys Gln Thr Glu Ser Glu Gln 20 25 30

Lys Leu Ser Lys Met Thr His Asn Ala Leu Glu Asn Ile Asn Val Ile 35 40 45

Gly Gln Gly Leu Lys His Leu Phe Gln His Gln Arg Arg Arg Ser Ser 50 55 60

Val Ser Pro His Asp Val Gln Gln Ile Gln Ala Asp Pro Glu Pro Glu 65 70 75 80

Met Asp Leu Glu Ser Gln Asn Ala Cys Ala Glu Ile Asp Gly Val Pro 85 90 95

Thr His Pro Thr Ala Leu Asn Arg Val Leu Gln Gln Ile Arg Val Pro 100 105 110

Pro Lys Met Lys Arg Gly Thr Ser Leu His Ser Arg Arg Gly Lys Pro 115 120 125 Glu Ala Pro Lys Gly Ser Pro Gln Ile Asn Arg Lys Ser Gly Gln Glu Met Thr Ala Val Met Gln Ser Gly Arg Pro Arg Ser Ser Ser Thr Thr Asp Ala Pro Thr Gly Ser Ala Met Met Glu Ile Ala Cys Ala Ala Ala Ala Ala Ala Ala Cys Leu Pro Gly Glu Glu Gly Thr Ala Glu Arg Ile Glu Arg Leu Glu Val Ser Ser Leu Ala Gln Thr Ser Ser Ala Val Ala Ser Ser Thr Asp Gly Ser Ile His Thr Asp Ser Val Asp Gly Thr Pro Asp Pro Gln Arg Thr Lys Ala Ala Ile Ala His Leu Gln Gln Lys Ile Leu Lys Leu Thr Glu Gln Ile Lys Ile Ala Gln Thr Ala Arg Asp Asp Asn Val Ala Glu Tyr Leu Lys Leu Ala Asn Ser Ala Asp Lys Gln Gln Ala Ala Arg Ile Lys Gln Val Phe Glu Lys Lys Asn Gln Lys Ser Ala Gln Thr Ile Leu Gln Leu Gln Lys Lys Leu Glu His Tyr His Arg Lys Leu Arg Glu Val Glu Gln Asn Gly Ile Pro Arg Gln Pro Lys Asp Val Phe Arg Asp Met His Gln Gly Leu Lys Asp Val Gly Ala Lys Val Thr Gly Phe Ser Glu Gly Val Val Asp Ser Val Lys Gly Gly Phe Ser

Ser Phe Ser Gln Ala Thr His Ser Ala Ala Gly Ala Val Val Ser Lys Pro Arg Glu Ile Ala Ser Leu Ile Arg Asn Lys Phe Gly Ser Ala Asp Asn Ile Pro Asn Leu Lys Asp Ser Leu Glu Glu Gly Gln Val Asp Asp Ala Gly Lys Ala Leu Gly Val Ile Ser Asn Phe Gln Ser Ser Pro Lys Tyr Gly Ser Glu Glu Asp Cys Ser Ser Ala Thr Ser Gly Ser Val Gly Ala Asn Ser Thr Thr Gly Gly Ile Ala Val Gly Ala Ser Ser Lys Thr Asn Thr Leu Asp Met Gln Ser Ser Gly Phe Asp Ala Leu Leu His Glu Ile Gln Glu Ile Arg Glu Thr Gln Ala Arg Leu Glu Glu Ser Phe Glu Thr Leu Lys Glu His Tyr Gln Arg Asp Tyr Ser Leu Ile Met Gln Thr Leu Gln Glu Glu Arg Tyr Arg Cys Glu Arg Leu Glu Glu Gln Leu Asn Asp Leu Thr Glu Leu His Gln Asn Glu Ile Leu Asn Leu Lys Gln Glu Leu Ala Ser Met Glu Glu Lys Ile Ala Tyr Gln Ser Tyr Glu Arg Ala Arg Asp Ile Gln Glu Ala Leu Glu Ala Cys Gln Thr Arg Ile Ser Lys Met Glu Leu Gln Gln Gln Gln Gln Val Val Gln Leu Glu Gly

Leu Glu Asn Ala Thr Ala Arg Asn Leu Leu Gly Lys Leu Ile Asn Ile

580 585 590

Leu Leu Ala Val Met Ala Val Leu Leu Val Phe Val Ser Thr Val Ala 595 600 605

Asn Cys Val Val Pro Leu Met Lys Thr Arg Asn Arg Thr Phe Ser Thr 610 620

Leu Phe Leu Val Val Phe Ile Ala Phe Leu Trp Lys His Trp Asp Ala 625 630 635 640

Leu Phe Ser Tyr Val Glu Arg Phe Phe Ser Ser Pro Arg 645 650

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<211> 26

<212> PRT

<213> Homo sapiens

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His Ser Val His Pro Pro Arg Leu Asp Leu 20 25

<210> 11

<211> 47

<212> PRT

<213> Homo sapiens

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Asn Cys Ser Ser Ser Pro Met Gln Arg Lys Gly Ser Tyr Cys Trp Asp $1 \hspace{1cm} 5 \hspace{1cm} 10 \hspace{1cm} 15$

Phe Glu Glu Met Val Leu Glu Gln Leu Glu Ile His Thr His Thr Lys
20 25 30

Asn Leu Asn Pro Tyr Leu Thr Pro Asp Thr Lys Ala Thr Phe Lys 35 40 45

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His Ser Val His Pro Pro Arg Leu Asp Leu 20 25

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Phe Glu Glu Ala Val Arg Cys His Trp Ala Val 20 25

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<212> PRT

<213> Homo sapiens

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Gly Lys Ser Gln Asp Ala Glu Ala Arg Lys Gln Thr Glu Ser Glu Gln 20 25 30

Lys Leu Ser Lys Met Thr His Asn Ala Leu Glu Asn Ile Asn Val Ile 35 40 45

Gly Gln Gly Leu Lys His Leu Phe Gln His Gln Arg Arg Arg Ser Ser 50 55 60

Val Ser Pro His Asp Val Gln Gln Ile Gln Ala Asp Pro Glu Pro Glu 65 70 75 80

Met Asp Leu Glu Ser Gln Asn Ala Cys Ala Glu Ile Asp Gly Val Pro 85 90 95

Thr His Pro Thr Ala Leu Asn Arg Val Leu Gln Gln Ile Arg Val Pro
100 105 110

Pro Lys Met Lys Arg Gly Thr Ser Leu His Ser Arg Arg Gly Lys Pro

Glu Ala Pro Lys Gly Ser Pro Gln Ile Asn Arg Lys Ser Gly Gln Glu Met Thr Ala Val Met Gln Ser Gly Arg Pro Arg Ser Ser Ser Thr Thr Asp Ala Pro Thr Gly Ser Ala Met Met Glu Ile Ala Cys Ala Ala Ala Ala Ala Ala Ala Cys Leu Pro Gly Glu Gly Thr Ala Glu Arg Ile Glu Arg Leu Glu Val Ser Ser Leu Ala Gln Thr Ser Ser Ala Val Ala Ser Ser Thr Asp Gly Ser Ile His Thr Asp Ser Val Asp Gly Thr Pro Asp Pro Gln Arg Thr Lys Ala Ala Ile Ala His Leu Gln Gln Lys Ile Leu Lys Leu Thr Glu Gln Ile Lys Ile Ala Gln Thr Ala Arg Asp . 245 Asp Asn Val Ala Glu Tyr Leu Lys Leu Ala Asn Ser Ala Asp Lys Gln Gln Ala Ala Arg Ile Lys Gln Val Phe Glu Lys Lys Asn Gln Lys Ser 280 . 285 Ala Gln Thr Ile Leu Gln Leu Gln Lys Lys Leu Glu His Tyr His Arg Lys Leu Arg Glu Val Glu Gln Asn Gly Ile Pro Arg Gln Pro Lys Asp Val Phe Arg Asp Met His Gln Gly Leu Lys Asp Val Gly Ala Lys Val

Thr Gly Phe Ser Glu Gly Val Val Asp Ser Val Lys Gly Gly Phe Ser

Ser Phe Ser Gln Ala Thr His Ser Ala Ala Gly Ala Val Val Ser Lys Pro Arg Glu Ile Ala Ser Leu Ile Arg Asn Lys Phe Gly Ser Ala Asp Asn Ile Pro Asn Leu Lys Asp Ser Leu Glu Glu Gly Gln Val Asp Asp Ala Gly Lys Ala Leu Gly Val Ile Ser Asn Phe Gln Ser Ser Pro Lys Tyr Gly Ser Glu Glu Asp Cys Ser Ser Ala Thr Ser Gly Ser Val Gly Ala Asn Ser Thr Thr Gly Gly Ile Ala Val Gly Ala Ser Ser Lys Thr Asn Thr Leu Asp Met Gln Ser Ser Gly Phe Asp Ala Leu Leu His Glu Ile Gln Glu Ile Arg Glu Thr Gln Ala Arg Leu Glu Glu Ser Phe Glu Thr Leu Lys Glu His Tyr Gln Arg Asp Tyr Ser Leu Ile Met Gln Thr Leu Gln Glu Glu Arg Tyr Arg Cys Glu Arg Leu Glu Glu Gln Leu Asn Asp Leu Thr Glu Leu His Gln Asn Glu Ile Leu Asn Leu Lys Gln Glu Leu Ala Ser Met Glu Glu Lys Ile Ala Tyr Gln Ser Tyr Glu Arg Ala Arg Asp Ile Gln Glu Ala Leu Glu Ala Cys Gln Thr Arg Ile Ser Lys Met Glu Leu Gln Gln Gln Gln Gln Val Val Gln Leu Glu Gly

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        35
Thr Ala Arg Asn Leu Leu Gly Lys Leu Ile Asn Ile Leu Leu Ala Val
    50
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Met Ala Val Leu Leu Val Phe Val Ser Thr Val Ala Asn Cys Val Val
                   70
Pro Leu Met Lys Thr Arg Asn Arg Thr Phe Ser Thr Leu Phe Leu Val
                                   90
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Val Phe Ile Ala Phe Leu Trp Lys His Trp Asp Ala Leu Phe Ser Tyr

105

110

100

Leu Glu Asn Ala Thr Ala Arg Asn Leu Leu Gly Lys Leu Ile Asn

Val Glu Arg Phe Phe Ser Ser Pro Arg 115 120

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Gly Lys Ser Gln Asp Ala Glu Ala Arg Lys Gln Thr Glu Ser Glu Gln 20 25 30

Lys Leu Ser Lys Met Thr His Asn Ala Leu Glu Asn Ile Asn Val Ile 35 40 45

Gly Gln Gly Leu Lys His Leu Phe Gln His Gln Arg Arg Arg Ser Ser 50 55 60

Val Ser Pro His Asp Val Gln Gln Ile Gln Ala Asp Pro Glu Pro Glu 65 70 75 80

Met Asp Leu Glu Ser Gln Asn Ala Cys Ala Glu Ile Asp Gly Val Pro 85 90 95

Thr His Pro Thr Ala Leu Asn Arg Val Leu Gln Gln Ile Arg Val Pro 100 105 110

Pro Lys Met Lys Arg Gly Thr Ser Leu His Ser Arg Arg Gly Lys Pro 115 120 125

Glu Ala Pro Lys Gly Ser Pro Gln Ile Asn Arg Lys Ser Gly Gln Glu 130 135 140

Met Thr Ala Val Met Gln Ser Gly Arg Pro Arg Ser Ser Ser Thr Thr 145 150 155 160

Asp Ala Pro Thr Ser Ser Ala Met Met Glu Ile Ala Cys Ala Ala Ala 165 170 175

Ala Ala Ala Ala Cys Leu Pro Gly Glu Met Pro Leu Pro Gly Thr

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Trp Ser Leu Ser Pro Leu 210

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<211> 653

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Gly Lys Ser Gln Asp Ala Glu Ala Arg Lys Gln Thr Glu Ser Glu Gln 20 25 30

Lys Leu Ser Lys Met Thr His Asn Ala Leu Glu Asn Ile Asn Val Ile 35 40 45

Gly Gln Gly Leu Lys His Leu Phe Gln His Gln Arg Arg Arg Ser Ser 50 60

Val Ser Pro His Asp Val Gln Gln Ile Gln Ala Asp Pro Glu Pro Glu 65 70 75 80

Met Asp Leu Glu Ser Gln Asn Ala Cys Ala Glu Ile Asp Gly Val Pro 85 90 95

Thr His Pro Thr Ala Leu Asn Arg Val Leu Gln Gln Ile Arg Val Pro
100 105 110

Pro Lys Met Lys Arg Gly Thr Ser Leu His Ser Arg Arg Gly Lys Pro 115 120 125

Glu Ala Pro Lys Gly Ser Pro Gln Ile Asn Arg Lys Ser Gly Gln Glu 130 135 140

Met Thr Ala Val Met Gln Ser Gly Arg Pro Arg Ser Ser Ser Thr Thr 145 150 155 160

Asp Ala Pro Thr Gly Ser Ala Met Met Glu Ile Ala Cys Ala Ala Ala Ala Ala Ala Ala Cys Leu Pro Gly Glu Gly Thr Ala Glu Arg Ile Glu Arg Leu Glu Val Ser Ser Leu Ala Gln Thr Ser Ser Ala Val Ala Ser Ser Thr Asp Gly Ser Ile His Thr Asp Ser Val Asp Gly Thr Pro Asp Pro Gln Arg Thr Lys Ala Ala Ile Ala His Leu Gln Gln Lys Ile Leu Lys Leu Thr Glu Gln Ile Lys Ile Ala Gln Thr Ala Arg Asp Asp Asn Val Ala Glu Tyr Leu Lys Leu Ala Asn Ser Ala Asp Lys Gln Gln Ala Ala Arg Ile Lys Gln Val Phe Glu Lys Lys Asn Gln Lys Ser Ala Gln Thr Ile Leu Gln Leu Gln Lys Lys Leu Glu His Tyr His Arg Lys Leu Arg Glu Val Glu Gln Asn Gly Ile Pro Arg Gln Pro Lys Asp Val Phe Arg Asp Met His Gln Gly Leu Lys Asp Val Gly Ala Lys Val Thr Gly Phe Ser Glu Gly Val Val Asp Ser Val Lys Gly Gly Phe Ser Ser Phe Ser Gln Ala Thr His Ser Ala Ala Gly Ala Val Ser Lys Pro Arg Glu Ile Ala Ser Leu Ile Arg Asn Lys Phe Gly Ser Ala Asp

Asn Ile Pro Asn Leu Lys Asp Ser Leu Glu Glu Gly Gln Val Asp Asp

Ala Gly Lys Ala Leu Gly Val Ile Ser Asn Phe Gln Ser Ser Pro Lys 405 410 415

Tyr Gly Ser Glu Glu Asp Cys Ser Ser Ala Thr Ser Gly Ser Val Gly
420 425 430

Ala Asn Ser Thr Thr Gly Gly Ile Ala Val Gly Ala Ser Ser Lys
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440
445

Thr Asn Thr Leu Asp Met Gln Ser Ser Gly Phe Asp Ala Leu Leu His 450 455 460

Glu Ile Gln Glu Ile Arg Glu Thr Gln Ala Arg Leu Glu Glu Ser Phe 465 470 475 480

Glu Thr Leu Lys Glu His Tyr Gln Arg Asp Tyr Ser Leu Ile Met Gln 485 490 495

Thr Leu Gln Glu Glu Arg Tyr Arg Cys Glu Arg Leu Glu Glu Gln Leu 500 505 510

Asn Asp Leu Thr Glu Leu His Gln Asn Glu Ile Leu Asn Leu Lys Gln 515 520 525

Glu Leu Ala Ser Met Glu Glu Lys Ile Ala Tyr Gl
n Ser Tyr Glu Arg 530 540

Ala Arg Asp Ile Gln Glu Ala Leu Glu Ala Cys Gln Thr Arg Ile Ser 545 550 555 560

Lys Met Glu Leu Gln Gln Gln Gln Gln Val Val Gln Leu Glu Gly
565 570 575

Leu Glu Asn Ala Thr Ala Arg Asn Leu Leu Gly Lys Leu Ile Asn Ile 580 585 590

Leu Leu Ala Val Met Ala Val Leu Leu Val Phe Val Ser Thr Val Ala 595 600 605

Asn Cys Val Val Pro Leu Met Lys Thr Arg Asn Arg Thr Phe Ser Thr 610 620

Leu Phe Leu Val Val Phe Ile Ala Phe Leu Trp Lys His Trp Asp Ala 625 630 635 Leu Phe Ser Tyr Val Glu Arg Phe Phe Ser Ser Pro Arg <210> 20 <211> 56 <212> PRT <213> Homo sapiens <400> 20 Met Glu Glu Lys Ile Ala Tyr Gln Ser Tyr Glu Arg Ala Arg Asp Ile 10 Gln Glu Ala Leu Glu Ala Cys Gln Thr Arg Ile Ser Lys Met Glu Leu 20 25 Gln Gln Gln Gln Gln Val Val Gln Leu Glu Gly Leu Glu Asn Ala 35 40 Thr Ala Arg Asn Leu Leu Gly Lys 50 <210> 21 <211> 14 <212> PRT <213> Homo sapiens <400> 21 Asn Cys Val Val Pro Leu Met Lys Thr Arg Asn Arg Thr Phe <210> 22 <211> 8 <212> PRT <213> Homo sapiens <400> 22 Glu Arg Phe Phe Ser Ser Pro Arg 5 <210> 23 <211> 23 <212> PRT

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<213> Homo sapiens

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<211> 591

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Gly Lys Ser Gln Asp Ala Glu Ala Arg Lys Gln Thr Glu Ser Glu Gln 20 25 30

Lys Leu Ser Lys Met Thr His Asn Ala Leu Glu Asn Ile Asn Val Ile $35 \hspace{1cm} 40 \hspace{1cm} 45$

Gly Gln Gly Leu Lys His Leu Phe Gln His Gln Arg Arg Ser Ser 50 55 60

Val Ser Pro His Asp Val Gln Gln Ile Gln Ala Asp Pro Glu Pro Glu 65 70 75 80

Met Asp Leu Glu Ser Gln Asn Ala Cys Ala Glu Ile Asp Gly Val Pro 85 90 95

Thr His Pro Thr Ala Leu Asn Arg Val Leu Gln Gln Ile Arg Val Pro 100 105 110

Pro Lys Met Lys Arg Gly Thr Ser Leu His Ser Arg Arg Gly Lys Pro 115 120 125

Glu Ala Pro Lys Gly Ser Pro Gln Ile Asn Arg Lys Ser Gly Gln Glu 130 135 140

Met Thr Ala Val Met Gln Ser Gly Arg Pro Arg Ser Ser Ser Thr Thr 145 150 155 160

Asp Ala Pro Thr Gly Ser Ala Met Met Glu Ile Ala Cys Ala Ala Ala 165 170 175

Ala Ala Ala Ala Cys Leu Pro Gly Glu Glu Gly Thr Ala Glu Arg Ile Glu Arg Leu Glu Val Ser Ser Leu Ala Gln Thr Ser Ser Ala Val Ala Ser Ser Thr Asp Gly Ser Ile His Thr Asp Ser Val Asp Gly Thr Pro Asp Pro Gln Arg Thr Lys Ala Ala Ile Ala His Leu Gln Gln Lys Ile Leu Lys Leu Thr Glu Gln Ile Lys Ile Ala Gln Thr Ala Arg Asp Asp Asn Val Ala Glu Tyr Leu Lys Leu Ala Asn Ser Ala Asp Lys Gln Gln Ala Ala Arg Ile Lys Gln Val Phe Glu Lys Lys Asn Gln Lys Ser Ala Gln Thr Ile Leu Gln Leu Gln Lys Lys Leu Glu His Tyr His Arg Lys Leu Arg Glu Val Glu Gln Asn Gly Ile Pro Arg Gln Pro Lys Asp Val Phe Arg Asp Met His Gln Gly Leu Lys Asp Val Gly Ala Lys Val Thr Gly Phe Ser Glu Gly Val Val Asp Ser Val Lys Gly Gly Phe Ser Ser Phe Ser Gln Ala Thr His Ser Ala Ala Gly Ala Val Val Ser Lys Pro Arg Glu Ile Ala Ser Leu Ile Arg Asn Lys Phe Gly Ser Ala Asp Asn Ile Pro Asn Leu Lys Asp Ser Leu Glu Glu Gly Gln Val Asp Asp

Ala Gly Lys Ala Leu Gly Val Ile Ser Asn Phe Gln Ser Ser Pro Lys 405 410

Tyr Gly Ser Glu Glu Asp Cys Ser Ser Ala Thr Ser Gly Ser Val Gly

Ala Asn Ser Thr Thr Gly Gly Ile Ala Val Gly Ala Ser Ser Lys

Thr Asn Thr Leu Asp Met Gln Ser Ser Gly Phe Asp Ala Leu Leu His

Glu Ile Gln Glu Ile Arg Glu Thr Gln Ala Arg Leu Glu Glu Ser Phe 465 470 475

Glu Thr Leu Lys Glu His Tyr Gln Arg Asp Tyr Ser Leu Ile Met Gln 485 490

Thr Leu Gln Glu Arg Tyr Arg Cys Glu Arg Leu Glu Glu Gln Leu 500 505

Asn Asp Leu Thr Glu Leu His Gln Asn Glu Ile Leu Asn Leu Lys Gln 515 520 525

Glu Leu Ala Ser Met Glu Glu Lys Ile Ala Tyr Gln Ser Tyr Glu Arg 530 535

Ala Arg Asp Ile Gln Glu Ala Leu Glu Ala Cys Gln Thr Arg Ile Ser 545 550

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<223> n is a, c, g, or t
<400> 38 .
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                                                                    120
ggggtggatt ttcgttgtcc gtggaagaac acatggatct ctctggcttt ctcacccaag
                                                                    180
ttggccactt acgctaatcc nggaagtatg nnnncttttg aacctgcccc ttaaccttga
                                                                     240
cgaggataca aaagtgaaag catcatcccc caaaggatca ctgcacagtc ctactacagt
                                                                    300
attittaagt agccctctaa atacttaatt ttaagcaaaa tcccttggcc gcacttttaa
                                                                    360
ggttttttta tatgtgtata gttaccaacc taaaaataaa aaatccqaac aqcatacttg
                                                                     420
```

453

aagaatgtaa tactcaaact ctcagtgctt cct